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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

GLASS PRODUCTS INSPECTOR 8-65.01

B-446 or S-178

U. S. Employment Service in
Cooperation with
Ohio State Employment Service

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.

January 1962

TM 001 309

GLASS PRODUCTS INSPECTOR 8-65.01

B-446 or S-178

Summary

The General Aptitude Test Battery, B-1002A, was administered to all female applicants referred to the Corning Glass Works in Greenville, Ohio. The sample used for this study consists of 51 women hired as Glass Products Inspectors 8-65.01. The criterion consisted of rank order ratings. On the basis of mean scores, standard deviations, job analysis data, and their combined selective efficiency, aptitudes P - Form Perception, Q - Clerical Perception, and K - Motor Coordination were selected for inclusion in the test norms.

GATB Norms for Glass Products Inspector 8-65.01 - B-446 or S-178

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Glass Products Inspector 8-65.01.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-446 or S-178

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
P	CB-1-A CB-1-L	75	P	Part 5 Part 7	75
Q	CB-1-B	95	Q	Part 1	95
T	CB-1-K	75	K	Part 8	80

Effectiveness of Norms

The data in Table V indicate that 9 of the 17 poor workers, or 53 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 53 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 29 of the 34 workers who made qualifying test scores, or 78 percent, were good workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Glass Products Inspector 8-65.01.

II. Sample

During the period of May-October, 1957, 129 female applicants were given the entire GATB, Form B-1002A. At the time that criterion data were collected, 51 of these applicants were employed as Glass Products Inspectors 8-65.01, at the Corning Glass Works, Greenville, Ohio.

Tests were not used in the selection of these workers. Except for the ability to read, write, and speak English, there were no entrance requirements with respect to age, education, and experience.

Training consisted of on-the-job instruction. Workers were considered as experienced and capable of full production at the end of one month.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

Glass Products Inspector 8-65.01

N = 51

	M	σ	Range	r
Age (years)	35.4	8.6	19 - 54	.208
Education (years)	10.7	1.5	7 - 12	.198
Experience (months)	26.5	1.4	24 - 29	.185

**Significant at the .01 level
*Significant at the .05 level

There are no significant correlations with the criterion for age, education or experience. The data in Table II indicate that this sample is suitable for test development purposes with respect to age, education and experience.

III. Job Description

Job Summary: Removes glass headlight lenses or reflectors for automobiles from a belt conveyor and visually inspects glass for quality defects such as cracks, chips, blisters, and foreign matter in glass. Replaces defective ware on conveyor. Places acceptable ware on pre-formed cardboard separation sheets used in packaging. Stacks ware and separation sheets, and places stack on another conveyor for routing to final packaging. Maintains records of number of pieces accepted and/or rejected, and records reasons for rejections.

IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of rank-order ratings determined by each individual shift supervisor's evaluation of each worker's overall job performance. Ratings were obtained in May, 1959. Seventeen of the workers were on the first shift, 13 on the second, 10 on the third and 11 on the fourth. Each of these groups was rated by a different shift supervisor. The rank-order ratings for each group were converted to linear scores and combined into one distribtuion for the sample of 51 workers.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Form Perception (P) - required in visual inspection of lenses and reflectors to determine acceptability of ware in terms of visually determinable properties.

Finger Dexterity (F) and Manual Dexterity (M) - required in picking ware from moving conveyor belt, manipulation of ware during inspection and stocking of ware and cardboard separators at completion of inspection.

On the basis of the job analysis data, Aptitude V was considered obviously unimportant for performing the duties of this job and was rated as an "irrelevant" aptitude.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 51

Aptitudes	M	σ	r
G-Intelligence	99.3	12.2	.173
V-Verbal Aptitude	99.5	11.4	.087
N-Numerical Aptitude	99.2	15.5	.256
S-Spatial Aptitude	98.9	15.2	.181
P-Form Perception	102.8	16.5	.143
Q-Clerical Perception	104.5	12.7	.234
K-Motor Coordination	103.0	13.1	-.073
F-Finger Dexterity	100.8	16.9	.082
M-Manual Dexterity	109.1	17.8	.073

**Significant at the .01 level
*Significant at the .05 level

Aptitudes P, Q, K and M have the highest mean scores and aptitudes G, V, Q and K have relatively low standard deviations.

For a sample of 51 cases, correlations of .358 and .276 are significant at the .01 level and the .05 level of confidence, respectively. None of the aptitudes correlate significantly with the criterion at either the .01 or .05 level of confidence.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important					X			X	X
Irrelevant		X							
Relatively High Mean					X	X	X		X
Relatively Low Sigma	X	X				X	X		
Significant Correlation with Criterion									
Aptitudes to be considered for trial norms					P	Q	K		M

Trial norms consisting of various combinations of three and four of Aptitudes P, Q, K and M with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of P-75, Q-95 and K-80 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 42 (linear score) was used and resulted in 17 of the workers, or 33 percent of the sample, being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes P, Q and K with critical scores of 75, 95 and 80 respectively, and the dichotomized criterion for Glass Products Inspector 8-65.01. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms (P-75, Q-95, K-80)

Glass Products Inspector 8-65.01

N = 51

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	5	29	34
Poor Workers	9	8	17
Total	14	37	51

$r_{tet} = .63$ $\quad X^2 = 6.510$

$\sigma_{r_{tet}} = .24$ $\quad P/2 < .01$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes P. Q and K with minimum scores of 75, 95 and 80 respectively, have been established as B-1002 norms for the occupation of Glass Products Inspector 8-65.01. The equivalent B-1001 norms consist of P-75, Q-95 and T-75.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.